Searching for the Midas Bits

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What application has the most valued data in the communications world?

Maybe I should refine the question to make it clearer: in terms of dollars per megabyte, what's the most valuable data application we've found so far?

Aside from prompting a few lengthy debates over an ale or two, the question does have a more serious purpose. In the wireless world where time, bandwidth, coverage and equipment are all expensive components, then the ideal match of application to medium for wireless will be these highly valued applications. So if we can identify which applications have the Midas touch, we can gain a useful view of what types of applications will provide the major impetus for the wireless Internet world. So lets start by laying the foundations for the search for these highly valued Midas bits.

In the previous article we looked at the family of radio technologies that underpin the wireless Internet. But radiating the bits through the ether from one location to another is only part of the Wireless Internet story. Lets build a bit more upon this lower level functionality and look at the characteristics of the applications that will populate this environment. How will the Wireless Internet be populated?

Now is all this really necessary? Surely, as the name suggests, the Wireless Internet is still going to be the Internet, but without the wire bits. And if that's the case, then won't it be the same applications, the same content, and the same services as we see on the wired internet today?

Maybe not. Wireless is different.

- Without a wire to guide the signal directly from the transmitter to the receiver, a wireless system radiates the signal in such a way that many receivers may pick up the transmission. Wireless networks require explicit addressing mechanisms at the transmission level to allow a transmitter to address a transmission to a single receiver

- With many potential receivers there is always the possibility of unauthorized eavesdropping of a wireless conversation. Useful wireless systems require some form of signal encryption to allow conversations to be conducted in private.

- Without a wire to shield one transmission from another, one transmitter may interfere with another. Wireless systems require some form of collision detection and avoidance protocol.

- Without a wire to shield the transmission, wireless systems are prone to noise. Wireless protocols need to include mechanisms to detect and possibly correct noise-based corruption of the transmission.

- There is no wire to tether a device to a fixed position in the network, so wireless devices can be mobile. Useful wireless systems require some level of protocol support to support roaming across the wireless coverage area, so that the wireless system is aware of the location of every active wireless device.

- There are some practical considerations as well. Mobile wireless devices need to be small and light, particularly if they are intended to live in your pocket. They need to use lightweight power sources with a long active life cycle, coupled with compact electronics. This normally requires the mobile wireless device to minimize its power use which, in turn, implies relatively low wireless power budgets. Mobile devices also need a wide radius of coverage in order to be useful. The combination of low power budgets and long distances tends to exacerbate the issues with wireless noise and wireless bandwidth.

So there's more to wireless than just the absence of wires.

The Wireless Internet will be different not only in the way that packets are transmitted, but in terms of the volume, speed and cost of data that can be carried. This, in turn, will create differences in wireless content and services. Now I'm the first to admit that this view is approaching Internet heresy. If one concedes that the Internet is now old enough to have traditions, then the traditional view of the Internet is that it is a uniform overlay across all kinds of transmission media, including wireless. Applications that use IP transport don't have to adapt to any particular media, be it wired or wireless. Great in theory. But not so great in practice.

The issue with wireless is that when you compared it to copper wires or fibre optic cables wireless is slow, noisy, insecure, complex, and paradoxically, expensive as well. The most effective use of wireless networks are with applications that use low data volumes and generate high value. In other words, the most effective use of wireless is by these highly valued "Midas Bits" that we started looking for at the start of this column. The low data volume implies that there is no dramatic impairment from a low speed high noise environment. The high value can offset the addition costs associated with wireless.

Of course, the more you can reduce the noise, increase the speed and decrease the cost, the more the wireless system tends to behave like a wired system. And this leads to the observation that not all wireless Internet systems are identical. Small radius wireless systems in controlled line of sight micro environments are perhaps the closest you can get to making wireless behave like wires. For 802.11 networks the Wired Internet and the Wireless Internet are pretty much the same. Because of the relatively low radius of coverage 802.11 looks a lot like the Cat5 cable network found in most offices. The major practical issue with 802.11 is the well publicized issue of security. The encryption protocol used to protect 802.11 networks from unauthorized use, the Wireless Encryption Protocol (WEP), has a vulnerability that is exploitable. While the security issues can be addressed with refinements to the encryption mechanisms, the major limitation of this particular wireless technology is the limited radius of coverage. 802.11 is fine of enclosed private or public spaces, or even in high density outdoor spaces as found in city centres, but if you are looking for a technology that can span an entire country with a consistent wireless service then it looks like some form of 3G-like wireless technology is required.

Now for wide coverage wireless networks, such as the family of 3G wireless systems, there will be quite some difference between wired and wireless. If the work in GSM, GPRS, CDMA and W-CDMA are any indication, then the 3G version of the wireless internet will have a large dose of all of the attributes that distinguish wireless from wire.

In populating the 3G world with applications we are searching for services that can pack a large amount of value in to just a few bytes. That means we're probably not talking Internet multimedia, nor any other form of data intensive application that literally spews streams of data across the wireless network.

In the 3G wireless world we are looking at personal devices that can fit unobtrusively in your pocket, complete with batteries. We are looking at devices that cannot absorb your dedicated attention for hours on end, but rather a device that can operate in an unattended mode and prompt for attention only intermittently. We are looking at applications that can lever the online computing capabilities of the Internet to refine large amounts of data into smaller information

segments that are sent through the wireless network. We are looking at applications that can combine this information with personal profiles, as well as locality information, in order to qualify information passed to the device so that its directly relevant to the user holding the device.

Its probably true to say that it was the World Wide Web that turned the wired Internet from a specialized tool for collaboration into a mass market commodity. This single application was able to lever the existing set of collaborative tools and join them together into a simple and consistent framework. It was this application that has been the underpinning of the wired Internet for the past decade. Could this work for the wireless world?

The efforts with iMode in Japan have been instructive when looking for applications for the 3G Wireless Internet that attempt to leverage the value of existing Web content. Yes, you can do a better job than the early versions of WAP in getting bits of the Web onto a pocket-sized portable device. But the Web and the various means of compressing web pages into a wireless restricted environment and a tiny handset is not the reason why iMode has proved so popular in its home market. This is a hand-held device that is a telephone, a pager, and an interactive multi-player games platform all in one, and it's the flexibility of application that appears to be its strength.

So its possible to infer from the efforts of the WAP Forum and iMode that the Web is relatively resistant to be repackaged on device that fits in your hand. It can be done, but it does not have the same ease of use as we've become accustomed to with a desktop computer, a large screen and a comfortable amount of bandwidth. Maybe for the 3G Wireless Internet we need to look for an application framework which is based on interactions with the user which may not involve typing on a keypad or creating a visual response to queries. Maybe we are looking at more specialized single task devices rather than general purpose computing platforms, and take the approach of populating a wireless world with services that draw heavily on the concept of embedding communications and communications capabilities into other devices.

Lets not forget that much of the background for the 3G efforts are an evolution of the earlier work in defining a mobile phone service, and maybe there's a lesson to be learned here. Recent years have seen a slackening of the growth in the number of voice minutes on the mobile networks, but an explosive growth in the number of Short Message Service (SMS) person-to-person messages. Its grown so large that in many markets SMS has all but decimated the pager. It has all the attraction of instant messaging, but with the convenience of being able to send and receive messages wherever you go, whenever you want. As a data application, SMS has all the positive attributes we've looking for in the wireless world: SMS messages have low data volumes, as well as being bandwidth efficient and, perhaps due to their personal focus, a very high value per bit.

How high a bit value is SMS? Well its not uncommon to see SMS tariffs of 25 cents per SMS message, and if the average message size is some 25 bytes, then that's an equivalent service tariff of 1 cent per byte, or 10,000 dollars per megabyte. To put that into perspective, the typical Internet access cost, when expressed as dollars per megabyte is somewhere around 1 cent to 1 dollar, depending on where you are in the world and what service you use. So it looks like SMS may well represent the highest value per bit in today's communications domain.

Today the Wireless Internet has a lot in common with the situation of the horseless carriage and the car. The first efforts in building the Wireless Internet appear to be directed towards emulating the functionality of the wired Internet. In the same way that over time the design and use for the horseless carriage had less and less in common with either the horse or the carriage, we can expect the wireless Internet to evolve over time into an application environment that will be different from that wired world. Over time it will have less and less in common with the wired Internet and become a communications environment in its own right. And the driver behind this will be a value proposition based on applications and services which can pack the highest possible value into each bit. So look for specialized small devices that attempt to embed communications services into the device's function. Look for devices that attempt to operate in

the background and only require occasional interaction with a person. And look for services that have true value in the eyes of the customer. And where you find the combination of these attributes is where you will find the wireless Internet, where the most valuable bits of data are – the Midas bits.